Department of Pesticide Regulation

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M E M O R A N D U M

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DATE: September 8, 1999

SUBJECT: MITIGATION PROPOSAL FOR TRIBUFOS (DEF)

I met with my staff to discuss the method used for calculating tribufos-estimated transfer factors for workers involved in cotton harvesting following a ground or aerial application.

In HS-1552, the author used dislodgeable foliar residue (DFR) levels predicted from a log-linear regression method to calculate transfer factors. This method resulted in extending the predicted values to a region inconsistent with actual values. Therefore, staff developed two other alternatives for calculating predicted DFR levels. Listed below is a comparison of the three methods used and my recommendation for mitigating exposures to cotton harvest operators. This memorandum is an addendum to Table 5 contained in HS 1552.

Calculations for Safe Residue Levels for Cotton Harvest Operators Exposed to Tribufos

Original Method: Transfer Factor based on DFR predicted from a log-linear curve.

Dermal Exposure (E)	DFR	Transfer Factor (E/DFR)
85.2 (day 15, air)	0.04	2130
137.2 (day 17, air)	0.02	6860
212.9 (day 20, ground)	0.04	5323
Average		4771

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Using the predicted DFR levels and the average Transfer Factor of 4771, it was concluded that the safe residue level was **0.085** µg/g. This would result in a restricted entry interval of 16 days using the predicted curve. This safe residue level of 0.085 µg/g is equivalent to a safe dermal exposure (dose) level of 406 µg/hr (dermal exposure dose = TF x DFR).

Alternate Method I: Transfer Factor based on DFR values measured on days on which the dermal exposures were monitored.

Dermal Exposure (E)	DFR	Transfer Factor (E/DFR)
85.2 (day 15, air)	0.05	1704
137.2 (day 17, air)	0.14	980
212.9 (day 20, ground)	0.06	3548
Average		2077

Using DFR values measured on days in which the dermal exposures were monitored, the average Transfer Factor would be 2077. This would result in a safe residue level of **0.196** µg/g. The recommended restricted-entry interval would be 10 days, using the log-quadratic curve.

Alternate Method II: Transfer Factor based on DFR predicted from a log-quadratic curve.

Dermal Exposure (E)	DFR	Transfer Factor (E/DFR)
85.2 (day 15, air)	0.07	1217
137.2 (day 17, air)	0.08	1715
212.9 (day 20, ground)	0.08	2661
Average		1864

Using the predicted DFR levels and the average Transfer Factor of 1864, it was concluded that the safe residue level was **0.218** µg/g. This would result in a restricted-entry interval of 9 days using the log-quadratic curve.

The safe residue levels and restricted-entry intervals under consideration include:

	Original Method.	AlternateMethod I.	Alternate Method II.
Average TF	**0.085** µg/g; day 16	**0.196** µg/g; day 10	**0.218** µg/g; day 9

I recommend using Alternate Methods I and II to determine the appropriate restricted-entry interval. I did not consider the Original Method because it resulted in extending the predicted values to a region inconsistent with actual values. Alternate Method I used the DFR values measured on days in which the dermal exposures were monitored to calculate the Transfer Factors. This calculation may be representative of the exposure potential to cotton harvest operators. However, this calculation uses only a few data points that may not take into consideration variances in the data. Alternate Method I used an improved DFR-predicted curve to calculate the safe residue levels. Alternate Method II used an improved DFR-predicted curve to calculate the Transfer Factor and the safe residue levels. This method may represent the highest confidence level because any anomaly in the data is corrected. Based on this information, I recommend a restricted-entry interval (REI) of 10 days. This recommendation used the average Transfer Factors because a subchronic NOEL is the end-point we are addressing. Therefore, the seasonal exposure selected reflects the subchronic NOEL (i.e., 0.95 mg/kg; rabbit, brain cholinesterase inhibition). This recommendation would add a level of conservatism if the 10-day REI were selected because the log-quadratic predicted curve used ground residues only and not the average of ground and aerial residue levels.

We recommend limiting the mitigation to a restricted-entry interval in lieu of personal protective equipment. Additional personal protective equipment may add a level of protection only if it is properly worn and cleaned. The REI proposed would mitigate all other tasks (i.e., cotton module builder operators, cotton rakers) performed as part of the harvest operation. The cotton module builder operators and cotton rakers would not be performing any tasks until harvest operations commenced.

If you have any questions, please contact me.

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